

### **REMARKS**

This is in response to the Final Office Action mailed 2/8/2007, and further in view of the Request for Continued Examination (RCE) submitted herewith.

Applicants have cancelled previously pending claims 1-22 and 24-25. Claims 25-49 have been newly added with respect to the RCE concurrently filed herewith. Applicants wish to emphasize that they are not conceding in this response that those claims are not patentable over the art cited by the Examiner, as the present claim amendments and cancellations are only for facilitating expeditious prosecution. Applicants respectfully reserve the right to pursue these and other claims in one or more continuations and/or divisional patent applications.

This response should obviate outstanding issues and make the pending claims allowable. Reconsideration of this application is respectfully requested in view of this response.

### **STATUS OF CLAIMS**

Claims 1-22, 24-25 are cancelled.

Claims 25-49 are newly added.

### **OVERVIEW OF CLAIMED INVENTION**

The present invention provides for a computer-based method to version a node range and locate a versioned node range in a storage architecture managing node ranges, wherein the computer-based method comprises the steps of: (a) receiving a node modification request (e.g., a node deletion request, a node insertion request, a node modification request, etc.) for a node range from a database system; (b) versioning said node range by copying, to a storage, a node

range to which said node modification request is to be made and *labeling said copied node range* with an identifier; (c) *locating said labeled node range via said identifier* (e.g., *timestamp* or *Log Sequence Number*) *and a hash on said node range*; and (d) outputting said located labeled node range.

The present invention also provides for a computer-based *method to version a node range* and to *locate a versioned node range* in a storage architecture managing node ranges via a *node id range index*, said each node assigned a *node id value* and a *set of nodes forming a node range*, *each entry in said node id range index pointing to a node range and its range identifier*, RID, said computer-based method implemented in computer readable program code stored in computer memory, said method comprising the steps of: (a) *receiving a node modification request* (e.g., a node deletion request, a node insertion request, a node modification request, etc.) *for a range*; (b) *versioning said range* associated with said node modification request by *shadowing nodes in said range to a Version Hash Table based on RID and assigning a time identifier to copies of said range*; (c) *locating a node in said shadowed range via said time identifier and RIDs*; and (d) outputting said located node range.

New readers, after a modification, access current nodes through a new RID and old readers access old nodes via the same RID, with the shadowed copy being locatable in said Version Hash Table by hashing the same RID.

In one embodiment, when modifications cause nodes in a range to be moved to a new RID, previous readers are redirected from the new RID to the old RID via a Redirection Hash

Table. In another embodiment, when modifications cause nodes in a range to be moved to a new RID, previous readers are redirected from the new RID to the old RID via an index that describes where old versions are in said Version Hash Table. In another embodiment, for range deletions, the range being deleted is moved to reserved RID RIDFF.

The present invention also provides computer medium carrying computer readable program code implementing the above-described methods.

**COMMENTS REGARDING GANESH ET AL. (6,057,236)**

**AND ODOM ET AL. (6,516,320)**

Ganesh teaches a computer-implemented method for providing a data item to a transaction, wherein the method comprises the steps of: (a) locating, within volatile memory, a first version of a data block that includes a first version of the data item; (b) determining whether the first version of the data item is usable by the transaction without respect to whether the first version of the data block is useable by the transaction; (c) if the first version of the data item is usable by the transaction, then establishing said data item as a candidate that can be provided to the transaction; and (d) if the first version of the data item is not useable by the transaction, then obtaining a version of the data item that is usable by the transaction from a second version of the data block that is different from said first version.

Odom teaches tiered hashing for data access wherein a memory for access by a program being executed includes a data access structure stored in memory, the data access structure

including a first and second index structure together forming a tiered index. According to Odom, at least one entry in the first structure indicates an entry in the second structure.

Ganesh and Odom fail to disclose, explicitly or implicitly, a storage architecture storing **ranges of nodes**. Further absent in either the Ganesh or Odom references, or the combined teachings of the Ganesh and Odom references, is the versioning of such **ranges of nodes**.

Also absent in the Ganesh or Odom references, or the combined teachings of the Ganesh and Odom references, is such versioning of a range of nodes by copying, to a storage, a **node range** to which said node modification request is to be made and labeling said **copied node range** with an **identifier**, such as a **timestamp** or **log sequence number**. Also absent from the Ganesh and Odom references is a teaching for locating a **labeled node range** using an **identifier**, such as a **timestamp** or **Log Sequence Number**, and a **hash on said node range**; and outputting such a located labeled node range.

Similarly absent from the Ganesh and Odom references is a teaching for versioning a **range associated with said node modification request by shadowing nodes in said range** to a **Version Hash Table** based on **RID** and **assigning a time identifier** to copies of said range, wherein the **shadowed range** is located via said **time identifier and RIDs**;

Absent such teachings, Ganesh and Odom cannot render obvious Applicants' pending claims.

SUMMARY

As has been detailed above, none of the references, cited or applied, provide for the specific claimed details of Applicants' presently claimed invention, nor renders them obvious. It is believed that this case is in condition for allowance and reconsideration thereof and early issuance is respectfully requested.

This response is being filed with a request for extension of time. The Commissioner is hereby authorized to charge the extension fee, as well as any deficiencies in the fees provided to Deposit Account No. 09-0460.

If it is felt that an interview would expedite prosecution of this application, please do not hesitate to contact Applicants' representative at the below number.

Respectfully submitted,

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